

SELF-ENCODING FIBER OPTIC SENSOR

Abstract of the Invention

A microsphere-based analytic chemistry system is disclosed in which self-encoding
5 microspheres having distinct characteristic optical response signatures to specific target analytes
may be mixed together while the ability is retained to identify the sensor type and location of
each sensor in a random dispersion of large numbers of such sensors in a sensor array using an
optically interrogatable encoding scheme. An optical fiber bundle sensor is also disclosed in
which individual microsphere sensors are disposed in microwells at a distal end of the fiber
10 bundle and are optically coupled to discrete fibers or groups of fibers within the bundle. The
identities of the individual sensors in the array are self-encoded by exposing the array to a
reference analyte while illuminating the array with excitation light energy. A single sensor array
may carry thousands of discrete sensing elements whose combined signal provides for
substantial improvements in sensor detection limits, response times and signal-to-noise ratios.